

### ABSTRACT

An image capture system for generating and storing an extended dynamic range digital image, includes a sparsely sampled extended dynamic range image sensing device having fast photosites with a predetermined response to light exposure interspersed with slow photosites with a slower response to the same light exposure for producing a sparsely sampled high resolution digital image having fast pixel values produced by the fast photosites and slow pixel values produced by the slow photosites; a digital image processor that employs the slow pixel values to expand the dynamic range of the fast pixel values in the sparsely sampled high resolution digital image to form a full resolution digital image having an extended dynamic range; a color encoder for reducing the dynamic range of the full resolution digital image to fit within the dynamic range of a storage color space having a dynamic range less than the dynamic range of the full resolution digital image to form a limited dynamic range digital image represented in the storage color space and for producing a residual image representing a difference between the full resolution digital image and the limited dynamic range digital image that can be used with the limited dynamic range digital image to reconstruct the full resolution digital image; and a digital image store for storing the limited dynamic range digital image in association with the residual image.